Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands	)	WT Docket No. 06-150
	)	
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems	)	CC Docket No. 94-102
	)	
Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones	)	WT Docket No. 01-309
	)	
Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services	)	WT Docket No. 03-264
	)	
Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules	)	WT Docket No. 06-169
	)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band	)	PS Docket No. 06-229
	)	
Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010	)	WT Docket No. 96-86

REPLY COMMENTS OF FRONTLINE WIRELESS, LLC

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SUMMARY

The coming 700 MHz auction is the last chance in a generation to solve public safety's deadly deficit in interoperable and broadband communications capabilities. It is also the last chance to break the current course towards wireless broadband and duopolies that will stifle innovation and competition. By creating the conditions for a shared, open access wholesale network with serious requirements for service tailored to public safety's requirements, the Commission will at long last be able to align market incentives with public safety needs. The public safety community needs unbroken coverage. A wholesale open access network built to provide roaming has to provide full nationwide coverage. The public safety community needs choice among competing device vendors. An open access network has every interest in supporting multiple devices and innovative, competitive retail services.

On the other hand, the record leaves no doubt that incumbent possession of this last precious low band spectrum will snuff out any hopes of substantial improvement in public safety communications infrastructure. The public safety commenters do not, and should not, believe existing commercial networks can do this job. The incumbents' rejection in this proceeding of extensive coverage requirements or even any requirements beyond their existing coverage confirms this skepticism, as do decades of failure by incumbents to respond to public safety's needs.

The initial comments in this proceeding also make clear that, after three months of public debate, there is no serious legal or practical objection to the Frontline proposal for addressing the twin goals of allocating a small portion of the 700 MHz spectrum to promote competition and innovation in the wireless and broadband markets and to have a commercial licensee build for free a national public safety network. A few commenters, primarily the largest

wireless/wireline carriers, raised objections that are easily seen through. There is nothing novel, let alone problematic, about the Commission's imposing buildout requirements. It routinely does so for satellite and broadcast licenses. Nor is there anything novel or problematic about requiring private license holders to assist public safety. The Commission imposes emergency warning system requirements on broadcasters and 911 requirements on cellular systems. The Commission has often wanted to provide for open access. That is what the "Four Freedoms" for broadband usage[1] and the *Carterfone* doctrine[2] represented in their time. The Commission has also regularly encouraged new small business entrants to participate in the communications industries by granting Congressionally-mandated bidding credits. And to protect against interruption of critical communications services in times of financial duress and even bankruptcy, the Commission requires Section 214 authorization holders to continue these critical operations until the Commission consents to their termination. It can and should do the same here.

The initial comments make equally clear that Verizon, as well as other incumbents, have no interest in using the 700 MHz spectrum in the foreseeable future for anything other than maintaining the status quo and insulating it from competition. Verizon does not even claim it would rebuild or design its base stations and handsets to tune to the 700 MHz frequencies. The incumbents' opposition to buildout requirements and the flat statement by Verizon that it would "integrate" the 700 MHz spectrum into its existing spectrum holdings effectively admit this. The incumbents also oppose any obligation to build a shared network that meets public safety's needs or a wholesale open access network that would promote competition

[1] *See* Remarks of Chairman Michael K. Powell, "Preserving Internet Freedom: Guiding Principles for the Industry," Silicon Flatirons Symposium on the Digital Broadband Migration, Boulder, CO, Feb. 8, 2004.

[2] *See Use of the Carterfone Device in Message Toll Telephone Service*, 13 F.C.C.2d 420, 424 (1968).

and innovation. In addition, the incumbents would thwart any realistic opportunity for small businesses to vie with them in the E Block auction by denying them bidding credits which are essential and for which they otherwise would be eligible under the Commission's rules.

There can no longer be a serious question that Frontline's Plan provides far greater security for public safety and accountability to the public for the efficient use of beachfront spectrum than the alternative. That alternative would allow incumbents to warehouse spectrum, consolidate control over the wireless and broadband markets, and limit support of public safety to a commercially lucrative footprint. Nearly twenty years after the Commission began the proceedings that led to the freeing up of analog UHF television frequencies, this outcome would be a tragic missed opportunity.

In these reply comments, Frontline addresses three major points raised in the initial comments:

1. Relying on the incumbent wireless providers to satisfy public safety's mission critical needs — or more of the same — is not a tenable option. The Frontline Plan fully complies with the law, and it alone will provide public safety with a privately-funded broadband, interoperable, nationwide network over which public safety will exercise complete control, including at the local level, with safeguards to preserve service in all events.
2. An open access wholesale network that supports nationwide roaming and on-demand spectrum auctions promotes innovation and competition for the benefit of public safety, new wireless entrants, rural consumers, and the public at large. The Commission should exercise its spectrum

allocation responsibilities to enable such a network using just 10 MHz out of 78 MHz in the 700 MHz band.

3. The Commission should also make possible the needed participation of small businesses in the E Block auctions by granting bidding credits to qualified entities in accordance with its normal, Congressionally-mandated policies.

Table of Contents

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REPLY COMMENTS OF FRONTLINE WIRELESS, LLC

The various dockets that this proceeding addresses reduce to two primary issues: (1) how can the 700 MHz allocation and auction process serve the country's need for a modern, interoperable, nationwide, broadband public safety network, and (2) how can the same process promote competition and innovation in the broadband and wireless markets that are dangerously trending toward sluggish and self-protective duopolies that will realize a fraction of the

spectrum's public interest potential and leave many Americans on the wrong side of the digital divide.

In these proceedings, the Commission thus far has done what it is supposed to do. It has asked the tough questions. It has obtained an effective and practical answer to the key policy issues. It has aimed high and tried to peer into the future. It has invited, and tried to accommodate, debate over new ideas. In short, and as required by the Communications Act, it is seeking to determine how the spectrum in question can be best used to serve the public interest. Congress has repeatedly made clear that such allocation decisions are quintessentially for the Commission to make.[3]

Back on February 26, Frontline responded to the Commission's invitation for new ideas by submitting its Plan in the above-captioned public safety proceeding. The Plan had three attributes: (1) it addressed the Commission's two primary goals in the now merged proceedings – to provide public safety through a shared public/private network with the broadband network that it so obviously needs and deserves and to establish a wireless broadband platform that will promote competition and innovation; (2) it proposed to meet these goals using only 10 MHz of the 78 MHz allocated for commercial use in the 700 MHz band; and (3), to aid in the refinement of its Plan, Frontline welcomed the process of on-the-record comment and informal discussion with Commission officials, members of Congress, public safety, and other parties with a stake in these issues.

The initial comments filed in this new stage of the proceeding on May 30 are the not-yet-final culmination of the process that Frontline sought to stimulate and that the

[3] Thus Congress specified in Section 309(j) that allocation decisions are not to be made through the auction process and that maximizing auction monies is not a motivation that should infect the Commission's allocation decisions.

Commission properly launched to assess the desirability of Frontline's Plan and to determine how to improve it. The initial comments show how the Commission should proceed.

They show a public safety community that recognizes its needs and challenges – interoperable, national broadband network; funding; access to additional spectrum in times of emergency; a warranted desire for control including local control; freedom in choice of devices; and broad, hardened, secure and restorable coverage. The incumbent commercial carriers have long treated the public safety community with indifference, and yet public safety is cautious about partnering with a new entrant to obtain the broadband services it requires. Its caution has led to refinements in the Frontline Plan that should provide it with the desired reassurance.

The commercial interests who filed in this proceeding include prospective users of Frontline's proposed open access wholesale network. They consist of (1) regional wireless providers for whose roaming problems Frontline's network would provide the fully effective answer, (2) manufacturers of new devices and providers of new services who are stymied or deterred by the existing and increasingly concentrated wireless and broadband oligopolies, (3) rural wireline providers who see Frontline's proposal as lowering barriers to entry toward the provision of wireless services in their rural territories, (4) public utility companies who, like public safety, need security and robustness in their broadband wireless communications network, and (5) new technology and Internet firms, who value the benefits that a wholesale open access broadband service would bring to their business sector and associated industries. The initial comments of these commercial interests bear witness to the need for an open access wholesale network and the bounty of public benefits it would make possible.

Another group of commercial commenters consist of the large incumbents – Verizon and AT&T, whose powerful and aggressive wireless businesses are linked to their

powerful and aggressive wireline businesses – and CTIA, their trade association. Their message is: there is no problem; if there is a problem we will fix it, but we make no proposals for how to fix it; and in any event we will pay top dollar at the auction so that we can corner the market, warehouse spectrum and keep on doing the same things that caused the problems in the first place or let the problems languish for years and years.[4] The messages of the incumbents provide unintended but powerful support for moving forward with the Frontline Plan

As a sampling of the incumbents' position in this proceeding, Verizon asserts that the 700 MHz auction gives the Commission "a rare opportunity . . . [to facilitate] the deployment of 4G wireless broadband networks."[5] But then Verizon's comments fail to state how it would use the spectrum to achieve this goal or to provide the broadband network that public safety needs. Its comments confess, however, that Verizon would "likely . . . *integrate 700 MHz licenses with existing complements* of 800 MHz cellular [which it largely obtained for free], 2 GHz PCS and 1.7/1.9 GHz AWS spectrum."[6] In other words, Verizon would do nothing meaningful with this spectrum except make sure that no one could use it either to build for free a network serving public safety or to provide a nationally roaming network for a legion of local and regional rivals that would ensure that the cellular duopoly did not raise prices beyond competitive levels and thwart innovation for years to come.

Verizon effectively admits its motives in its vigorous opposition to any buildout requirements. As a fallback it offers a 75% coverage-of-population standard despite the fact that

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[4] MetroPCS is a strong critic of the Frontline Plan apparently because it wishes to bid for spectrum in small geographic areas (which Frontline supports), and it fears that if the Frontline Plan for a national E Block license is adopted, less spectrum will be available for its ambitions. MetroPCS makes no effort to submit a constructive solution to public safety's problems or to the need for more competition and innovation in the broadband and wireless markets.

[5] Comments of Verizon, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 2 (May 23, 2007), ("Verizon Comments").

[6] *Id*. at 26 (emphasis added).

it already has in place a large infrastructure of towers and other facilities of any carrier, despite the fact that public safety and Frontline have proposed a 99% coverage-of-population standard and despite the fact that its fallback proposal would leave 25% of the people in this country without any possible access to wireless broadband (hardly a game plan to enable this country to improve its 15th place ranking in broadband penetration).[7] But Verizon does have a reason to bid for the spectrum – to make sure that no one else steps in to jumpstart competition in a highly concentrated industry or to give public safety what it needs and what Verizon has failed to provide over many years.

Under Verizon's 75% coverage-of-population standard, it would merely claim that its existing towers already meet that standard. It does not even say that it would redesign those towers to receive signals on 700 frequencies or that it would put into the marketplace handsets that would use those frequencies. Obviously Frontline would, since it has no other business activities that its 700 MHz service would supplant. The difference between what Verizon plans and what Frontline proposes for the E Block is the difference between nothing and something. What a tragic result if the Commission were to allow this critical spectrum to be sold to incumbents who never used it. After nearly 20 years of Congressional debate about how and when to reclaim this vital spectrum, it would be tragic if the Commission made bad policy decisions that deliver this spectrum into the Verizon warehouse.

The initial comments, therefore, compel the conclusion that the Commission was right in the way it has shepherded this proceeding and that it must not falter now in determining its outcome. Although there are uncertainties (there always are), one point is not uncertain: a Commission decision to pull back from the plainly right course will deny public safety an

[7] Organisation for Economic Co-operation and Development, "OECD Broadband Statistics to December 2006" (2007) ("OECD Report").

adequate solution to its broadband needs and will entrench the commercial wireless incumbents and thereby stifle competition and innovation. The Commission should adopt the allocation proposal for a 10 MHz E Block that will share a common network with public safety and that on the commercial side will offer open access wholesale network services to all-comers, serve critical infrastructure providers and devote at least 25% of its network capacity to an open active auction. Making bidding credits available to small businesses that qualify under the Commission's Rules, which pursuant to Congressional directive the Commission routinely does in other auctions, is no mere add-on proposal but a necessary ingredient to achieving these goals.

* * *

In their separate statements to the *Further Notice* that asked for comment on the Frontline Plan, all of the Commissioners focused on the primacy of the public interest standard in making the proper allocations decisions in this proceeding. Thus, Chairman Martin, in his statement, identified two public interest goals for the allocations decisions to be made here – (1) "promoting broadband deployment and penetration" and (2) "meeting the needs of public safety." As to the first goal Chairman Martin emphasized: "One important factor spurring both increased broadband availability and reduced prices is competition among broadband platforms."

This view was echoed by the other Commissioners in their own separate statements: "We need to maximize the possibility that new competition emerges from this spectrum opportunity" (Comm'r Adelstein); "[T]he FCC must do more to get broadband services deployed to all Americans" (Comm'r Tate); "I don't think any of us should be relying on wireless companies owned by wireless broadband providers to provide this much-needed competition" (Comm'r Copps);[8] and "Opening up the Lower and Upper 700 MHz Band for

[8] On Saturday, the *New York Times* published an op-ed piece by Commissioner Copps that called for exercise of the Commission's *licensing* responsibility to assure that the public interest standard is met in the broadcast renewal process. This proceeding calls for the imposition of *allocations* conditions on the E Block license – building a

auction is America's best opportunity for spurring more competition in the broadband market" (Comm'r McDowell).

Frontline's Plan is the only set of proposals that constructively seeks to achieve these goals. The only other option – maintaining, or more accurately cementing, the status quo by allocating the spectrum in the usual manner for it to be acquired by deep-pocket incumbents with a history of indifference to public safety's needs and a business strategy and motivation that resist competition and innovation – would not serve the public interest.

I. FRONTLINE'S PLAN PROVIDES PUBLIC SAFETY WITH AN INNOVATIVE SOLUTION TO THE CURRENT LACK OF A NATIONWIDE, INTEROPERABLE NETWORK, AND MEETS OTHER PUBLIC SAFETY NEEDS.

A. The Record Confirms that Frontline's Plan Effectively Addresses the Needs of Public Safety.

The comments filed by the public safety community show strong support for key parts of the Frontline Plan, and Frontline is confident that the remaining specifics can be successfully addressed. The State of Hawaii perhaps stated it best: "the Frontline proposal seems to be an excellent compromise between various proposals for Commercial/Public Safety sharing of broadband resources."[9] The Missouri State Highway Patrol stated that they "support the concept of a national network operator as outlined in the Frontline proposal that works with

shared network with public safety and open access wholesale operation on the commercial side (plus accommodating critical infrastructure providers and implementing an open active auction) – that will serve the public interest in the wireless and broadband environments. Licensing and allocation are of course two sides of the same coin — they are two ways the Commission has of ensuring that the scarce spectrum assets be used by commercial licensees to serve public policy purposes. As public dialogue increasingly expands over the Internet and wireless, in particular, the allocations condition requiring wholesale open access operations will assure a wireless outlet for the expression of diverse ideas and a means of accessing this diversity for all Americans.

[9] Comments of the State of Hawaii, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 3 (May 23, 2007) ("State of Hawaii Comments").

the national licensee in order to facilitate a public safety broadband strategy."[10] APCO acknowledged that a conditional auction, similar to Frontline's proposal, "could provide the path to a national public safety broadband network."[11] And Cyren Call stated that the Frontline Plan "could be workable if subject to appropriate regulatory oversight."[12]

Throughout the last few months, Frontline has continuously worked with the public safety community to further develop its Plan to better suit public safety's needs. The comments submitted by public safety make clear the basic structure of Frontline's Plan incorporates many of the features most important to public safety and that no other plan has emerged as a suitable basis for responding to public safety's needs. These features include: (1) funding for a nationwide buildout of the interoperable, broadband public safety network to be managed jointly with the National Public Safety Licensee ("NPSL"); (2) extensive coverage requirements and deadlines for a network built to public safety's standards; (3) the flexibility to build interim public safety broadband systems; and (4) making issuance of the E Block license contingent on the successful execution of a network sharing agreement with public safety.[13]

1. Funding a Nationwide Buildout and the NPSL.

First, Frontline has proposed that while the E Block license should of course go to the highest bidder in the auction, nevertheless that license should carry the condition that the licensee construct a shared nationwide, interoperable broadband network that will serve the

[10] Comments of the Missouri State Highway Patrol, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 30 (May 23, 2007) ("Missouri State Highway Patrol Comments").

[11] Comments of the Association of Public Safety Communications Officials-International, Inc. *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 6 (May 23, 2007) ("APCO Comments").

[12] Comments of Cyren Call, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 11 (May 23, 2007) ("Cyren Call Comments").

[13] See pp. 9-10 below for further elaboration of this requirement.

broadband needs of public safety. Funding remains a primary concern for public safety; yet many commercial commenters simply ignored this fundamental concern. APCO warned that "while some local governments may be able to build their own broadband networks…most will lack the funds to deploy such state-of-the-art systems," and that providing an adequate funding mechanism for a nationwide, broadband public safety network is the "primary benefit" of Frontline's Plan.[14] Frontline's Plan is the only proposal to offer to fund the buildout for public safety.

In addition to the importance of funding the construction of the shared public safety network, Frontline also agrees with APCO and NPSTC on the benefit of a single NPSL to manage the public safety spectrum.[15] Frontline commends the public safety community for its progress in developing a structure for the NPSL. It has suggested that the Commission issue the public safety license to the "Public Safety Spectrum Trust Corporation," which would be "managed by a Board of Directors drawn from those associations representing public safety communications."[16] This framework is headed in the right direction. Like any prospective E Block licensee, Frontline would be obligated to work with a single national licensee who can represent all public safety users.

2. Unprecedented Coverage Requirements and Deadlines for a Network Built to Public Safety Standards.

The E Block licensee should be bound by the extensive coverage requirements and timelines for the common network that Frontline proposed in its Initial Comments. No other commercial provider expressed support for the scope of buildout coverage proposed by Frontline

[14] *See* APCO Comments at 11.

[15] *See* APCO Comments at 13-14; Comments of the National Public Safety Telecommunications Council, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 5 (May 23, 2007) ("NPSTC comments").

[16] NPSTC Comments at 5-6.

or as established by the *Further Notice* – or as held out by the public safety community as its desired goal.

NPSTC stated that "public safety needs a reliable system that has the best possible coverage. It is not enough to have coverage that merely mirrors traditional cellular coverage."[17] Based on the needs expressed by public safety, Frontline's proposed rules would require that the nationwide, interoperable, broadband public/private safety network be built to cover 99% of the population within 10 years, with specific interim milestones.[18] This is similar to the buildout requirements proposed by the public safety community.[19] The public safety community has made clear that current commercial networks will not be sufficient for public safety's needs.

Frontline has proposed rules requiring the E Block licensee to construct the network to public safety standards. The rules should, in addition, require the high bidder for the E Block license to work with the NPSL to design a network that meets public safety's needs. These obligations should alleviate the concerns expressed by APCO and other parties about the suitability of the typical commercial networks and their inability to reach enough of the population and geographic area of the country and "withstand natural disasters to the same degree as public safety systems."[20]

3. Interim Systems

Even the aggressive buildout that Frontline proposes be required will result in some communities receiving broadband service later than others. Taking this reality into

[17] *Id.* at 12.

[18] *See* Frontline Comments at 40, for further details.

[19] *See* NPSTC Comments at 12; APCO Comments at 18.

[20] APCO Comments at 12.

account, Frontline submitted a proposal[21] that addresses the NPSTC and APCO proposals for a rule allowing local and regional public safety entities to construct broadband networks on a temporary basis.[22] These locally constructed, interoperable broadband networks should be approved by the NPSL to insure compatibility of design with the national network and would be incorporated into the nationwide, interoperable broadband network, immediately upon its being operational in their communities. The E Block licensee would be required to compensate the local agencies for the reasonable costs of integrating such networks into the national network.

The Commission should follow through on its tentative conclusion to devote 12 MHz[23] of public safety spectrum exclusively for broadband use because broadband "best serve[s] [the] goal of enabling first responders to protect safety of life, health and property."[24] To accommodate those in the public safety community who hold the view that wideband systems provide some benefits, Frontline has proposed that the Commission allow public safety to utilize portions of its narrowband spectrum for wideband applications.[25] In light of various comments asking for the ability to deploy wideband systems in the 12 MHz of spectrum allocated for public

[21] *See* Frontline Comments at 54-55 ("Consequently, local agencies and governments working closely with the NPSL and Regional Planning Commissions in these areas may wish in the interim to build early broadband network systems that are consistent architecturally with the national interoperable network. The NPSL should approve these buildouts to ensure that the systems could be merged into the national shared network when it goes on line").

[22] *See* NPSTC Comments at 20; APCO Comments at 21-22.

[23] This includes the needed internal guard band, which will not be utilized for the broadband network.

[24] *See Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, et al.*, Report and Order and Further Notice of Proposed Rulemaking, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket N. 06-229, FCC 07-72, at ¶ 253 (rel. April 17, 2007) ("*Further Notice*"). Qualcomm, Lucent and others have stated that broadband provides far better performance and capacity than wideband and at least as good a range. Moreover, such broadband systems are already in the commercial market today, whereas wideband systems meeting the FCC SAM standard have yet to be deployed. *See* Comments of Alcatel-Lucent, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 2-13 (May 23, 2007); Qualcomm, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 15-31 (May 23, 2007).

[25] *See* Frontline Comments at 55.

safety broadband usage,[26] the Commission could reserve the flexibility to approve wideband systems in the broadband spectrum, case by case, only upon a showing of special circumstances and only *until* the nationwide, interoperable broadband network becomes operational in the area in question. If the Commission adopts such a policy, however, it should make clear that these systems would be temporary and that the public safety agency would be required to dismantle them, without cost reimbursement, immediately upon completion of the broadband network in the affected area.

4. Public Safety's Proposed Statement of Requirements and the Network Sharing Agreement.

Frontline strongly supports APCO's and NPSTC's proposal that the public safety community agree upon and publish a "Statement of Requirements" substantially prior to the E Block auction.[27] This Statement of Requirements would spell out key service requirements such as performance objectives that would inform the architecture of the shared public private network.[28] This Statement of Requirements, which will take into account the need for the network to be viable (the public safety community will have a vital stake in the financial viability of the shared network), should be reasonable and flexible. Details should be left to the network sharing agreement, as technology and service decisions will evolve overtime. Issuance of the Statement of Requirements will ensure that all bidders for the E Block license will be fully aware

[26] *See* APCO Comments at 6-7; NPSTC Comments at 16-22; Missouri State Highway Patrol Comments at 11-16.

[27] *See* APCO Comments at 15 ("we recommend, therefore, that the national public safety licensee compile a detailed statement of requirements (SOR) or similar document as soon as possible after adoption of the auction rules, and that the SOR be made available to prospective bidders"); *see also* NPSTC Comments at 10 ("the national public safety licensee should prepare a document, such as a 'statement of requirements' that would be available to prospective bidders"); Verizon Comments at 7 ("if the Commission elects to proceed with a "conditioned license" approach, it will need to work with Public Safety to determine their specific requirements in advance of the auction).

[28] Service requirements are commonly used to define the end users' needs that are then translated into technology specifications.

of public safety's needs prior to bidding on the spectrum. This also help to prevent disputes after the auction.

Frontline also encourages the Commission to incorporate as many of these requirements into the final auction rules as appropriate with enough lead time for bidders to take them into account. Issuance of the Statement of Requirements, and even more so, adoption of some of the requirements in the Commission's rules, will ensure that all bidders for the E Block license will be fully aware of the E Block licensee's obligations to public safety prior to bidding on the spectrum. These requirements will also help to prevent disputes after the auction.

The Commission will not be able to adopt rules that address all potential facets of the shared public/private network relationship, since some details will need to be worked out by the NPSL and the winning E Block bidder after the auction is concluded and the long form application has been submitted. The resulting network sharing agreement will determine the design and features of the shared network between the E Block licensee and the NPSL. The design will be in accordance with public safety specifications to the extent technically and commercially reasonable to the E Block licensee.

Frontline also strongly supports the Commission's tentative conclusion to impose binding arbitration in the case of an impasse between the putative E Block licensee and the NPSL, and believes the Commission itself should be the arbitrator of a dispute that either party could bring to the Commission. [29] The Commission should also establish deadlines of four months from the conclusion of the auction to enter into a sharing agreement and 60 days thereafter for conclusion of any necessary Commission arbitration.[30] This negotiation period would run parallel with the long form application review process, thus accelerating the time to

[29] *See Further Notice* at ¶ 282.

[30] *See id.*

construction. Of course, the status of the network sharing agreement negotiations must have no bearing on review of the long form application, since the two are not related and the mandatory arbitration is the vehicle for addressing public safety's concerns.

Significantly, NPSTC recognized that binding Commission arbitration "may be a viable option insofar as the Commission's decisions would be driven by the Communications Act and its obligations to promote safety of life and property."[31] We concur. While APCO remains opposed to binding arbitration by the Commission, it has acknowledged that Commission arbitration is preferable to third party arbitration.[32]

Nevertheless, the APCO comments suggest that the NPSL should be free to walk away from the Commission's arbitral decision, thereby triggering a forfeiture and re-auction of the E Block license.[33] That proposal would abrogate the Commission's non-delegable licensing responsibility, is illegal, and would harm public safety because with such a rule no one could raise money to build the network for free for public safety.[34]

Frontline is willing to support a requirement that the E Block licensee, which obtains the license by virtue of being high bidder and having its long form approved in the normal course, would have its license conditioned on accepting the Commission's arbitration decision over contested parts of the network sharing agreement. The Commission would

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[31] NPSTC Comments at 11-12.

[32] *See* APCO Comments at 16.

[33] *See id.* at 16-17.

[34] *See* Frontline Comments at 44 ("To allow the NPSL to decide whether the E Block license should issue to the otherwise qualified winning bidder would violate the Commission's statutory licensing responsibility," *citing United States Telecom Association v. FCC*, 359 F.3d 554, 566 (D.C. Cir. 2004) ("[S]ubdelegations to outside parties are assumed to be improper absent an affirmative showing of congressional authorization."); 47 U.S.C. § 301 (purpose of Communications Act "to maintain the control of the United States over all the channels of radio transmission"); *id.* at § 303 (establishing Commission authority over the grant of licenses); *id.* at § 309(j)(1) ("[T]he *Commission* shall grant the license or permit to a qualified applicant through a system of competitive bidding"); *id.* at § 309(j)(5) ("No licenses shall be granted to an applicant pursuant to this subsection unless *the Commission* determines the applicant is qualified….") (emphasis in both added)).

adjudicate any dispute according to a standard that any requirement is technically and commercially reasonable to the network operator. If the NPSL, after a period of 30 days, rejects the Commission's arbitral decision, and thereby rejects the network sharing agreement, the E Block licensee then would have satisfied its obligations to negotiate with public safety and abide by any arbitral decision, and there will be no other obligations with respect to the network sharing agreement. At that juncture the NPSL should be given 180 days to negotiate alternative network arrangements with other carriers. In sum, the E Block license is granted to the high bidder after the usual long form review, the NPSL and the putative E Block licensee work to reach an agreement, and if not, then the E Block auction winner must accept the arbitration decision of the Commission. If the NPSL still objects to a partnership, and also fails to reach agreement with any other carrier, then its license should terminate and public safety's broadband spectrum should be licensed to the Regional Planning Committees or appropriate state or local agencies.

This may seem like tough medicine. The Commission's national public safety licensee concept is laudable and Frontline fully supports it. But if agreement cannot be reached after all the pro-public safety steps described above have been taken, including Commission arbitration, the Commission must step in to assure that public safety's needs are met and valuable spectrum does not lie fallow. In any case, Frontline believes that none of these contingencies will be necessary. The incentives of all involved to reach agreement are too strong, the pull of the parties' common ground too powerful.

Throughout this process, there has been a great deal of discussion regarding the obligations of the E Block licensee. While this has been necessary and justified, the NPSL will also be a licensee of valuable spectrum, and the public safety community has pressing needs. It

is for these reasons that the Commission must adopt rules to ensure that this spectrum is not wasted and these needs are met.

5. Avoiding Discontinuance of Service

Finally, because of the valid concerns expressed by the public safety community about what would happen to their network if the E Block licensee encountered financial difficulties, Frontline proposed that the Commission require the E Block licensee to continue providing service, even in the face of bankruptcy, unless and until the Commission grants permission to discontinue service, a procedure already utilized under Section 214 of the Act with the intention of preserving services recognized as important by the Commission. APCO and NPTSC both endorsed the usefulness of this protective mechanism.[35] Adoption of a procedure similar to one the Commission uses in the context of Section 214 licenses would provide all the protections necessary to ensure continued service. The other protective mechanisms suggested by NPSTC and APCO would only add costs and discourage would-be bidders for the E Block spectrum.

B. Under Frontline's Plan, Public Safety Will Retain Control Over its Spectrum.

From the outset, Frontline has agreed that the public safety community must retain control over its spectrum.[36] Frontline's Plan provides for a voluntary agreement that encourages parties to negotiate a mutually beneficial network sharing agreement. In Frontline's proposed service rules,[37] all the requirements are imposed only on the E Block licensee. For example, Section 27.16(b) of Frontline's proposed service rules, which covers the network

[35] *See* APCO Comments at 20; NPSTC Comments at 14-15.

[36] *See* NPSTC Comments at 11-12; APCO Comments at 5-6, 15-16; Verizon Comments at 6-7; *See* Comments of Frontline Wireless, LLC, *Service Rules for the 698-746, 747-762 and 777-792 MHz Band et al.*, WT Docket No. 06-150, 06-169, PS 06-229 at 7, 11 (March 6, 2007) ("Frontline Service Rules Proposal"); Frontline Comments at 42.

[37] *See* Frontline Service Rules Proposal at 5.

sharing agreement, requires the E Block licensee to "enter into good faith negotiations," obligates the E Block licensee to "consult with the Public Safety Licensee on the design construction, and operation of the shared network," and mandates that the E Block licensee "permit emergency preemption by public safety users on its commercial spectrum."[38] We should remember that Frontline's proposal is, at root, a mechanism for providing public safety with access to *more spectrum* for a wireless broadband network, but sharing is an option, not a requirement, for the NPSL. The NPSL always retains full control of its license and the decision to partner with the E Block winner.

The provision for binding Commission arbitration would not encroach on the NPSL's control over its spectrum. This is only a reasonable and quite limited condition on the NPSL's license. All Commission licenses come with conditions and the national broadband public safety license would be no exception. Even that modest and sensible condition could be accompanied, as proposed above, by the right of the NPSL to walk away from the Commission's arbitral decision, but only if the NPSL then takes prompt and effective steps to put the spectrum to its intended use of serving public safety's needs by entering into alternative arrangements.

C. Frontline's Plan is Responsive to Public Safety's Needs.

Frontline's Plan was developed to ensure that the public safety community, and the country as a whole, will receive the benefits of the much needed nationwide, interoperable, broadband public safety network. It was also inspired by the need for a wholesale, open access, broadband network that would promote innovation and competition among commercial service providers. Commissioner Copps expressed the view that public safety's needs in an ideal world

[38] *See* Frontline Service Rules Proposal at p. 5 of draft service rules.

should have been met by a different solution – a government solution.[39] But he supported consideration of the Frontline Plan because he recognized that it is the only concrete, statutorily viable, comprehensive proposal for the creation of an adequate public safety network. Frontline's Plan will enable public safety to obtain the network it so desperately needs and deserves.

Verizon and CTIA have claimed that Frontline's Plan was not "designed with public safety in mind,"[40] and will "undermine the benefits of a partnership model."[41] No foundation is provided for these accusations. Worse, these same parties, the wireless incumbents, have had *years* to make an agreement with public safety to construct a shared network, and have failed to do so. It did not happen in the mid-1990s when additional spectrum was first made available to public safety. It did not happen after 9-11. It did not happen after Hurricane Katrina. And there is no basis to believe it will happen now. Without a mechanism for public safety to enter into a public/private partnership with a commercial operator who is required by a condition of its license to fund the buildout of a nationwide, broadband, interoperable public safety network, this country will remain without such a network.

1. Frontline's Buildout Commitment is Unmatched.

Frontline has demonstrated its commitment to public safety through its proposal for fully funding the buildout of a nationwide, public safety network that will cover 99% of the population. Frontline is the only non-public safety entity interested in bidding on spectrum to put forth a statutorily viable plan that incorporates extensive national buildout requirements. Verizon's RFP proposal, on the other hand, ignores public safety's need for wide-area coverage

[39] *See Further Notice,* Statement of Commissioner Michael J. Copps at 160.

[40] CTIA, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, at 19 (May 23, 2007) ("CTIA Comments").

[41] Verizon Comments at 44.

and focuses solely on commercial coverage needs in terms of population.[42] Both Verizon and AT&T devote a significant portion of their comments to opposing *all* buildout requirements.[43] AT&T argues that "imposing geography-based construction requirements could significantly discourage auction participation," [44] and Verizon makes similar arguments.[45]

After its adamant opposition to any buildout requirements, Verizon states that "if the Commission believes that specific buildout rules are necessary," it proposes that licensees cover "75 percent of the POPS in their license area."[46] Just 75 percent — which one-fourth of America does Verizon want to leave behind? Remarkably, Verizon criticizes Frontline for not having public safety's best interests in mind, and then in the next breath proposes a buildout that would disenfranchise one-fourth of our country's population and the majority of its landmass. Its proposal would create have's and have-not's in the 700 MHz world, which is contrary to the Commission's goal to use the favorable propagation characteristics of this band to help solve the digital divide.[47] Frontline's proposal, by contrast, would ensure that 75 percent of the U.S. population is covered *within five years* from the DTV transition, reaching 95 percent two years later, and 99 percent within 10 years.

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[42] Frontline's proposed coverage requirements are framed in terms of population but the levels of its proposed requirement are calculated to achieve extensive geographic coverage as public safety urges.

[43] *See* Verizon Comments at 23-34; Comments of AT&T, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 11-20 (May 23, 2007), ("AT&T Comments").

[44] AT&T Comments at 16.

[45] *See* Verizon Comments at 27-28.

[46] *Id.* at 28-29.

[47] *See Further Notice*, Statement of Commissioner Deborah Taylor Tate at 168 ("The adoption of today's item is a critical step towards achieving this shared goal. The inherent propagation characteristics of the 700 MHz band could make it less expensive to construct new networks covering larger geographic areas, making it ideal for expanding the availability of broadband in rural areas. At the same time, the band potentially provides better in-building coverage than higher frequencies, which not only would facilitate the provision of advanced services in urban areas but also could help improve 911 access and location system performance").

Verizon also makes clear that it believes that current, commercial-grade networks will suffice when it argues that "there is no evidence that wireless broadband services are not being deployed in rural areas."[48] In fact, Verizon's filing makes painfully clear that it plans no extension of its base stations for 700 MHz, that it will not put into the marketplace for public safety or commercial users handsets or laptops tuned to 700 MHz, and it will not open its closed standards to innovative products. CTIA echoes this belief by noting that "wireless carriers are aggressively extending their networks to consumers."[49] How can public safety hope to receive its nationwide broadband network from providers who believe that current coverage is sufficient? The answer is, it cannot.

Finally, Verizon claims there is "no logical nexus between being the winning bidder for the E Block license and being the entity best suited to construct the Public Safety broadband network,"[50] but this misses the point that the conditions that Frontline urges the Commission to impose on the E Block license – conditions that the incumbents oppose – will require the winning bidder to serve public safety's interests. Furthermore, any entity that is able to secure financing and win the auction for the E Block will have convinced sophisticated private investors that there is a viable business plan worthy of large-scale investment.

2. The Proposed Conditions on the Network's Commercial Operation Are Consistent with Public Safety's Interests.

Frontline's proposals for commercial operations on the shared network work hand in hand with its public safety features. The result will be a shared public/private network that will benefit public safety and commercial users alike. Arguments by the wireless incumbents questioning Frontline's business model and its effects on public safety are designed to ward off

[48] Verizon Comments at 24.

[49] CTIA Comments at 4.

[50] Verizon Comments at 56.

competition. The Frontline Plan, in addition to its public safety features, also incorporates open access, wholesale and roaming requirements for the commercial operations on the shared network. Some of these commercial features will also benefit public safety. Of course, these commercial elements of the Plan are primarily intended to advance commercial access to broadband spectrum, which should be another important Commission goal for the 700 MHz spectrum.

Open Access

The proposed open access network is technologically feasible, will not cause harm to public safety, and will create competitive benefits. As previously explained and as further elaborated in the attached study by Farpoint Group, open access principles can be readily implemented and are compatible with public safety services.[51] Verizon's assertion that the "concept of an open access network is inherently incompatible with Public Safety's stated need to have a network built to particular standards, performance requirements and reliability," is without any support in the record. [52] Furthermore, it is conclusively rebutted by the conclusion in the Farpoint study that the technology exists today to implement open access and offer network features that give public safety a secure and reliable network.[53]

An open access commercial network will provide benefits to the public safety community by creating more competition among device manufacturers and service providers and thereby will free public safety to make purchases from a range of device manufactures and service providers at far lower prices than they presently pay.[54] Public safety will still maintain

[51] *See* Exhibit 1: Declaration of Craig Mathias at 8, ("Exhibit 1").

[52] Verizon Comments at 48.

[53] *See* Exhibit 1 at 4-6.

[54] *See* Comments of Frontline at 20-23.

total control over what devices are allowed to access the public safety IP network domain, and will have complete assurance as to the security of its network. More generally, an open access network will spur technology and service innovations, some of which will undoubtedly benefit pubic safety.

Wholesale

The proposed wholesale requirement will shield public safety from conflicts that would arise if public safety were forced to obtain services from a single retail commercial service provider. Implicit in Verizon's criticism of Frontline's proposed wholesale requirement is the unsupported assumption that retail wireless services would better serve public safety's needs. This assertion is belied by Verizon's inability to point to any retail service tailored to public safety's needs. Moreover, by offering open access to its network services, Frontline gives multiple vendors the ability to sell to public safety, so as to promote competition in price and service. In contrast, an E Block commercial service provider who is not motivated to promote its own commercial retail services will more effectively serve the public safety community. As Cellular South noted, "the Frontline proposal is so important to both public safety and commercial users" and without Frontline's "restrictive license conditions … any bidder could acquire the license and refuse to build it out as intended or, at the very least, not use good faith in negotiating with public safety and commercial operators."[55] Under wholesale principles, public safety will have the benefit of transparent pricing reached in a commercial, wholesale and competitive environment.

[55] Comments of Cellular South. *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 20, (May 23, 2007) ("Cellular South Comments").

Roaming

Despite self-serving claims by wireless incumbents to the contrary, Frontline's proposed roaming requirement is intrinsic to fulfilling the E Block licensee's commitment to the construction and operation of an interoperable, nationwide broadband network for public safety. In fact, many public safety entities require service that stretches outside a given local commercial licensee's territory and in all cases an interoperable national public safety network should enable public safety users to go online and communicate whether located near the headquarters or in some other region.

D. The Shared Public Safety/E Block Network Comports with Section 337.

The Commission has rightly concluded that public safety can grant secondary use of its spectrum to a private firm for commercial purposes and can obtain under emergency circumstances primary use of commercial spectrum. The Commission has understood, after all, that under all circumstances spectrum belongs to the public, and that private commercial use of that spectrum is obtained by permission from the Commission. Section 1 and Section 301 of the Communications Act plainly permit the Commission to make spectrum available for secondary use and that is what it should do here.

Frontline's Plan allows for secondary, immediately and automatically preemptible commercial use on a network primarily dedicated to public safety in the 700 MHz band. Noting in the *Ninth NPRM* public safety's insurmountable financial hurdle to constructing a national, 4-G, state-of-the-art interoperable public safety network, the Commission found that such a public/private partnership "comport[s] with all statutory requirements."[56] Moreover, the *Further Notice* in this proceeding did not re-raise the issue. Despite that conclusion, a number of

[56] *See Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band et al., Ninth Notice of Proposed Rulemaking*, WT Docket No. 96-86, PS Docket No. 06-229, FCC 06-181 at ¶ 46 (December 20, 2006) ("*Ninth NPRM*").

commenters have, for the most part half-heartedly, argued that such an arrangement raises questions under Section 337 of the Communications Act which they claim precludes any secondary commercial uses in spectrum primarily allocated for public safety use.[57]

That section, however, merely provides instructions to the Commission concerning what spectrum to auction, thus resolving after nearly twenty years the Congressional debate concerning the migration of broadcasters from analog to digital. Neither the intent nor the language of 337 expresses any limitation on the traditional power of the Commission to grant secondary use of spectrum to private parties for commercial purposes whenever the Commission determines that serves the public interest. The authorization of a public/private network partnership, however, falls well within the Commission's authority to adopt spectrum policies that serve the public interest and set conditions upon its use. Secondary commercial use of public safety spectrum in a manner that enables the buildout of a public safety network, as proposed by the Commission and fleshed out by Frontline, is consistent with Section 337 and makes possible the larger goals of that statute.

Section 337(a) requires that 24 MHz of spectrum be allocated for public safety services and that the remaining 36 MHz be allocated for commercial uses. The purpose of the public safety allocation, the Commission said, "was to help meet the need of public safety to ensure interoperable communications among various public safety organizations, provide for growth of existing systems, and accommodate new types of services that will strengthen and

[57] Some commenters argue that § 337 precludes such an arrangement, *see, e.g.*, Verizon Comments at 53 (Verizon also suggests that the public safety use of the network on commercial spectrum violates § 337 as well); CTIA Comments at 20; Comments of MetroPCS, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 54 n.132 (May 23, 2007), ("MetroPCS Comments"), while others ask the Commission to consider the issue. *See, e.g.*, Comments of Sprint-Nextel, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 9 (the statutory issues are "far from insurmountable, [but] merit far greater scrutiny in the record than they have received thus far") (May 23, 2007) ("Sprint-Nextel Comments"); Comments of NATOA *et al.*, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, 01-309, 03-264, 06-86, PS Docket No. 06-229, CC Docket No. 94-102 at 15 (May 23, 2007) ("NATOA Comments").

enhance public safety."[58] The Frontline Plan satisfies these purposes. Moreover, public safety maintains control over the spectrum, and the network will automatically and instantaneously preempt secondary commercial uses in order to give priority to public safety use, allowing public safety 100% access when needed. Despite Verizon's conclusory claim to the contrary, in no way does the Frontline Plan "upset the careful balance Congress struck"[59] – indeed, the Frontline Plan enhances this balance by also giving priority to public safety on commercial frequencies used by the shared network. As the Commission recognized in the *Ninth NPRM*, a public/private partnership to create a nationwide wireless broadband network that allows preemptible secondary commercial uses *expands* the ability of public safety entities to provide "public safety services."[60] Of course, the arrangement for commercial use of unoccupied public safety frequencies makes it possible for the E Block licensee to bear the cost of constructing the shared network and thereby strongly promotes the goal of meeting public safety's needs. In short, the Frontline Plan significantly improves upon the status quo that Verizon's comments tacitly endorse.

Nothing in Section 337 stands in the way of allowing secondary uses that do not interfere with the 700 MHz block's primary allocation. Not a word of the statute addresses secondary uses, and the Commission regularly allows such uses. Authorization of non-interfering unlicensed devices is one current example. The Commission has consistently recognized that Section 301 does not bar the authorization of unlicensed devices in licensed or unlicensed spectrum if the device operates without constraining the operations of primarily

[58] *Ninth NPRM* at ¶ 1.

[59] *See* Verizon Comments at 53. Verizon offers no support or citation for the proposition that a primary statutory allocation completely precludes any other secondary uses, or that the Commission "has no authority" to allow a licensee to share its network with other users.

[60] *See* 47 U.S.C. § 337(a)(1).

allocated licensed services. In other words, so long as the Congressional purpose in requiring licenses – management of the spectrum – is achieved, the Commission may permit other operations, in that case unlicensed use, on a secondary basis as well.[61] Likewise, so long as secondary, commercial use of the public safety network does not interfere with public safety's use thereof, the Commission has met its statutory mandate to allocate spectrum for public safety services.[62]

Allowing commercial secondary usage is also entirely consistent with the Commission's wide discretion to "establish terms and conditions" over public safety services under the statute. Section 337(a) states the Commission shall allocate spectrum for public safety services "*according to the terms and conditions established by the Commission* …."[63] In the *Ninth NPRM*, the Commission determined that a public/private partnership would "best promote the rapid deployment of a nationwide, interoperable broadband public safety network, and thereby improve emergency responsiveness."[64] Such a finding rests squarely within the Commission's broad authority to "function[] as a policymaker" in "fostering innovative methods of exploiting the spectrum" – exactly the kind of decision "accorded the greatest deference by a reviewing court."[65]

Finally, Section 337(f)(1) does not support the argument that the public safety allocation in the 700 MHz band completely precludes any manner of secondary uses in that

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[61] *See Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, 19 FCC Rcd 24558, 24590 ¶ 68 (2004). The Table of Frequency Allocations at Section 2.106 of the Commission's rules sets out dozens of primary and secondary allocations sharing the same band of spectrum. *See* 47 C.F.R. § 2.106.

[62] It also runs totally contrary to modern Commission spectrum policy to bar a licensee from sharing its spectrum if it wishes to do so.

[63] 47 U.S.C. § 337(a) (emphasis added).

[64] *See Ninth NPRM* at ¶ 3.

[65] *Teledesic LLC v. FCC*, 275 F.3d 75, 84 (D.C. Cir. 2001).

spectrum.[66] That language defines "public safety services" for the purpose of Section 337 as "services the sole or principal purpose of which is to protect the safety of life, health and property that are provided by State or local governmental entities … that are not made commercially available to the public *by the provider*."[67] Thus, it defines the type of use allowed under the *primary* allocation – public safety service, for which providers are not allowed to charge. That definition is not relevant to a secondary allocation for preemptible, non-interfering commercial uses by entities other than the public safety services provider. As the Commission found in the *Ninth NPRM*, allowing secondary commercial uses in spectrum primarily allocated to public safety is contemplated by the Commission's mandate to make efficient use of that spectrum under Section 337(a).[68]

E. To Ensure Public Safety Receives its Much Needed Broadband Network, the Commission Must Adopt a Band Plan Incorporating an E Block.

The Commission should adopt an upper 700 MHz commercial band plan which incorporates an E Block in order to facilitate a shared public/private network which will meet public safety's needs.[69] As the Mid-Sized ILECs explained, the Commission should "designate

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[66] *See, e.g.*, Verizon Comments at 55-56.

[67] 47 U.S.C. § 337(f) (emphasis added).

[68] To the degree that commenters rely on the Commission's Secondary Markets proceeding to buttress claims that the agency is barred from allowing secondary commercial uses in the 700 MHz spectrum allocated for public safety, *see, e.g.*, CTIA Comments at 21 (citing *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Second Report and Order, 19 F.C.C. Rcd. 17503 ¶ 53 (2004)), such claims are inapposite. *First*, the Commission "declined at th[e] time" to allow secondary commercial uses because secondary commercial uses could "allow potential abuses without implementation of certain safeguards" and might cause "spectrum [to] be used by commercial entities to the potential detriment of public safety operations." *Id.* ¶¶ 56, 55. However, by the time of the *Ninth NPRM*, the Commission had decided that new technologies would ensure unconditionally and instantaneously preemptible public safety access to the leased spectrum – a conclusion that no commenter disputes, including any commenter representing public safety's interests. *See Ninth NPRM* ¶ 45. *Second*, the Commission plainly stated in the *Ninth NPRM* that to the degree its Secondary Markets rules precluded such a partnership, it would revise them. *See id.* ¶ 44 ("we propose that we should amend the Commission's spectrum leasing rules to permit the national public safety licensee to enter into spectrum leasing arrangements with commercial entities").

[69] *See* Comments of Northrop Grumman, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 5-6 (May 23, 2007) ("Northrup Grumman

a 10 MHz block of commercial spectrum next to Public Safety spectrum in the upper 700 MHz band for a nationwide license."[70] Horizon Telecom, Inc. expressed its support "for a new 'E-Block' commercial 700 MHz licensee to construct and operate a nationwide, interoperable broadband network for sharing with a national public safety licensee in the lower portion of the 700 MHz public safety spectrum." The National Emergency Number Association supports the "positioning and sizing of commercial spectrum blocks in ways that best accommodate the treatment of the E block as a single national geographic license."[71]

In order to maximize the spectrum available for such a public/private network, Frontline proposed a modified version of the Proposal 4 band plan in its initial comments.[72] Cyren Call also submitted a modified version of Proposal 4 in which it proposes relocating the A Block.[73] Frontline supports Cyren Call's band plan as a viable alternative to its own. Both plans create an E Block, help to maximize the amount of spectrum devoted to the shared public/private network, and solve the Canadian Border interference issue.

While Frontline continues to support Proposal 4 with some modifications, if the Commission decides to adopt another band plan, such as the Access/Pegasus Proposal 3, the

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Comments"); Comments of Vanu, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 4, (May 23, 2007) ("Vanu Comments"); Comments of Aloha Partners, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 3, (May 23, 2007) ("Aloha Partners Comments"); Cellular South Comments at 16; Comments of Public Interest Spectrum Coalition, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 19 (May 23, 2007) ("Public Interest Spectrum Coalition Comments"); Comments of Enterprise Wireless Alliance Comments, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 4, (May 23, 2007) ("Enterprise Comments").

[70] Comments of Mid-Sized ILECs, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 5, (May 23, 2007) ("Mid-Sized ILECs Comments").

[71] Comments of NENA, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.,* WT Docket Nos. 06-150, 06-169, 96-86, 01-309, 03-264, 06-86, PS Docket No. 06-229, CC Docket No. 94-102 at 2, (May 23, 2007) ("NENA Comments").

[72] *See* Frontline Comments at 51-54.

[73] *See* Cyren Call Comments at Attachment 1.

proposed E Block could and should be incorporated to ensure the creation of a shared public safety network. As Google noted, the Frontline Plan is not incompatible with band plan Proposal 3.[74] To that effect, several parties simultaneously supported Proposal 3 and the Frontline Plan to create an E Block.[75] This approach would merely require the Commission to substitute an E Block in the place of the current D Block in Proposal 3, and attach to it the various conditions proposed by Frontline.

II. THE PROPOSED OPEN ACCESS, WHOLESALE AND ROAMING REQUIREMENTS WOULD ADVANCE THE COMMISSION'S GOALS OF PROMOTING WIRELESS COMPETITION, INNOVATION, AND BROADBAND PENETRATION.

Frontline's Plan has two purposes: the first is to meet the urgent needs of public safety and the second is to meet the urgent need for innovation and competition in the wireless broadband market and bring the benefits of broadband to all Americans. The Commission has an historic opportunity to shape the future of wireless broadband in America, which in turn will open the door to innovators and bring competition and therefore innovation to a rapidly consolidating broadband marketplace. Adopting the key elements of open access, wholesale and roaming will enable the Commission to realize that future. These three conditions on the E Block license are well within the Commission's historic precedents. They have drawn support from various commenters who have an interest in competition and innovation are criticized only by the incumbents who plainly have a business interest in promoting consolidation and seeking anticompetitive prices.

[74] *See* Google Comments at 8, note 19 ("Moreover, while Frontline's plan is premised on a slightly different band plan than that proposed by the 4G Coalition, these differences can be reconciled without great difficulty)."

[75] *See also* Missouri State Highway Patrol Comments at 18-19; Google Comments at 7-9, Northrop Grumman Comments at 4-5.

A. The Comments Show That Wholesale Wireless Service Will Promote Competition and Innovation.

The primary goal of Frontline's proposed wholesale service rules is to promote competition by reducing barriers in the wireless market in both the provider and user layers. With a facilities-based wholesale provider, both new and existing retail providers will be freed from the often prohibitive costs of purchasing low-frequency spectrum and constructing wireless networks. As a result, these providers will be able to enter the market or expand existing service offerings with a small fraction of the capital costs that would otherwise be required.

Comments submitted in response to the *Further Notice* confirm the benefits of the proposed wholesale requirement. Specifically, the comments provide concrete examples – from companies who routinely struggle with the formidable barriers to entry – of both the need for, and the benefits of, wholesale service.[76] For instance, in supporting Frontline's proposed wholesale service requirement, the Mid-Sized ILECs (i.e., Embarq, CenturyTel, Citizens/Frontier) specifically described the prohibitive costs of network buildout:

> [T]he Mid-Sized ILECs are convinced that consumers in rural and underserved areas will benefit greatly . . . if the Commission ensures that that upcoming auction is structured to promote the emergence of a nationwide wholesale wireless broadband alternative[.] . . . Broadband deployment in rural areas is costly, in significant measure because of the challenges caused by low population densities, which make it difficult to aggregate the customer demand needed to justify large network investments. The Commission should consider requiring the winner of at least one block of spectrum to make broadband capacity available on a wholesale basis as this will facilitate demand aggregation and supplement broadband deployment in sparsely-populated areas. Today, there are a very limited number of spectrum owners interested in providing wholesale access to spectrum, and there are

[76] *See, e.g.*, Mid-Size ILECs Comments at 3-5; Center for Democracy and Technology Comments, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 6-7, (May 23, 2007) ("Center for Democracy and Technology Comments"); Public Interest Spectrum Coalition Comments at 19-20; Google Comments at 8-9; Vanu, Inc. Comments at 5-6.

> no purely wholesale network operators without a competing retail offering.[77]

The Mid-Sized ILECs' comments demonstrate in concrete detail how and why wholesale service can translate into greater broadband deployment, particularly in rural areas. In these areas, it is often economically irrational for providers to build state-of-the-art wireless broadband facilities. As a result, rural buildout is stymied. The wholesale service proposal provides a way around this economic reality by making rural wireless service cost-effective for retail service providers.

The wholesale service requirement would also encourage and rely on market-based forces, rather than command-and-control regulation, to meet the concerns identified by commenters like the Mid-Sized ILECs. Instead of relying on universal service support, Frontline's Plan addresses the critical problem of rural broadband deployment with private sector solutions that do not burden taxpayers. Further, wholesale service will create market-based incentives to complement the Commission's proposed buildout requirements, which Frontline supports. In opposing these requirements, Verizon has objected that they will result in only a "skeletal build."[78] To the contrary, as a wholesale provider, the E Block licensee will have strong incentives to attract the maximum number of commercial retail providers to pay for the expensive network buildout. It will do so by constructing a modern, state-of-the-art, IP-based network at every location where it builds. Equally important, it will seek to attract as many users as possible on the network.

A *retail* provider, by contrast, has the opposite incentives – i.e., it has strong incentives to deny roaming to rival retailers and to win the end user customers of its rivals for

[77] Mid-Sized ILECs Comments at 3-4.

[78] Verizon Comments at 27.

itself. Accordingly, Verizon's incentives, which its initial comments do not camouflage, are not aligned with the emergence of a robustly competitive wireless market.

B. The Comments Show That the Open Access Wireless Service Requirement Will Promote Competition and Innovation.

Frontline's proposed open access service rules are also intended to promote competition and innovation by lowering the costs of market entry. They ensure that service providers (e.g., content companies, applications providers) have guaranteed access to customers, which is the lifeblood of providers in the broadband and wireless markets.

Several parties' comments confirm the need for an open access network and provide examples of the benefits that an open access network will bring to them and to the state of competition in the broader broadband market.[79] Google, for instance, outlined its critical need for guaranteed access to its customers:

> The greater challenge [Google faces] is . . . universal accessibility. Like other Internet-based companies, Google relies on the communications infrastructure provided by underlying carriers in order to reach our ultimate end users. In particular, in the United States, the telephone companies and cable companies control the only means of broadband access to Google's customers.[80]

Vanu, Inc. explained that the anti-competitive restrictions placed on modern wireless devices and technology are relics of the past that are hindering modern innovation:

> Despite the obvious benefits of open networks, wireless networks have remained closed domains. A combination of factors, including lack of publicly available content and lack of suitable supporting technologies, required early networks to limit what subscribers were able to access and how they were able to access

[79] *See, e.g.*, Google Comments at 8-9; Vanu, Inc. Comments at 4-6; Center for Democracy and Technology Comments at 7-8; Public Interest Spectrum Coalition Comments at 12-27.

[80] Google Comments at 2. Frontline will also be filing separate comments concerning Google's innovative concepts for ongoing auctions of licensee capacity in the secondary marketplace. Indeed, as noted in Frontline's initial comments, by providing for the E Block licensee's sale of at least twenty-five percent of network capacity in open active auctions, the Commission could further enhance opportunities for the online innovators of today and tomorrow to enter the wireless marketplace.

> it. The technological constraints that created these limits are dissolving quickly. . . . The historical reasons for closed networks no longer apply. Open access will allow consumers and businesses to use networks in the manner that is best suited for such businesses and consumers. By allowing them the flexibility to explore and invent new ways of using networks, society benefits.[81]

Objections to the open access proposal came, predictably, from those whose retail businesses have the most to lose from competition and innovation. Verizon, for instance, opted to argue the "net neutrality" debate rather than address the merits of Frontline's open access proposal, which is a different issue.[82] Regardless of its merits, the debate on net neutrality involved imposing restrictions on *all* broadband access providers in any medium, wireline or wireless, and, *retroactively*, on incumbents. Frontline's open access proposal, by contrast, applies a license condition to a fraction of the 700 MHz spectrum which aspiring new entrants will voluntarily choose to bid on, in full knowledge of that condition.[83] Google captures the distinction well:

> While some have objected to the adoption of mandatory safeguards against packet discrimination, this aspect of the Frontline proposal would merely add an "E Block" license condition, which any entity can choose not to accept by not bidding for that particular license. Thus, Frontline presents a unique market-based approach to fostering open networks.[84]

Other commenters attempted to confuse the issue by claiming that open access threatens network security or complicates compliance with CALEA and E-911.[85] As the attached Farpoint study shows, these assertions ignore both the meaning of open access and the

[81] Vanu, Inc. Comments at 4-5.

[82] Verizon Comments at 46-49.

[83] If the party had other wireless spectrum holdings, winning the E Block would be conditioned on operating an open access network on the other spectrum. It would not apply to the wireline networks operated by affiliates.

[84] Google Comments at 8-9.

[85] *See, e.g.*, MetroPCS Comments at 51-52; Verizon Comments at 46.

state of modern, IP-based technology.[86] "Open access" principles restrict the ability of the E Block licensee – the access provider – to discriminate unreasonably against particular types of services, applications, and content. It does not dictate how the customers of the shared network – commercial retailers or public safety users – will use the network service capacity they purchase. For instance, the open access requirement would in no way prevent a public safety user or any user from setting up internal virtual private networks to send secured communications. Indeed, modern IP-based communications can be even more secure than the existing narrowband and wideband communications generally used by public safety today. As Farpoint states, because individual communication streams can carry different security keys or mechanisms, "[t]here are no key technical issues associated with establishing and maintaining security communications over a shared-access network," and "[c]ommercial and public-safety traffic can be secured according to policies appropriate to each."[87] In fact, open access will *promote* public safety's security interests by making available a greater diversity of equipment, built from commercial components at a lower cost.

C. The Comments Demonstrate That the Roaming Requirement Will Promote Competition and Innovation.

Like the wholesale and open access requirements, the goal of Frontline's proposed roaming service rules is to lower the costs of market entry for existing and prospective competitors. In particular, a nationwide roaming provider – as Frontline proposes – would encourage wireless competition (particularly in rural areas) by freeing existing competitors from the need to construct facilities or purchase access from entrenched national incumbents who offer competing retail services.

[86] *See* Exhibit 1 at 1-4, 7-8.

[87] *See* Exhibit 1 at 10.

Comments filed in response to the *Further Notice* confirm the need for competitive roaming arrangements.[88] Cellular South, in particular, describes both the lack of existing competitive options for mid-sized carriers and its causes and consequences:

> Frontline's proposal would provide a much-needed broadband roaming partner for small and regional wireless providers. Today, small and regional carriers find it increasingly difficult, if not outright impossible, to negotiate high-speed data roaming agreements with national wireless providers. This hurts the small carriers but, more importantly, it hurts the rural consumer. Wireless users move about and expect their wireless devices to work just as well when traveling as they do in the user's home coverage area. With Frontline's proposal, small and regional carriers would have the ability to guarantee this type of coverage to their customers.[89]

Cellular South's comments directly refute Verizon's assertion that "such a requirement is unnecessary" because "[c]arriers *already* routinely agree to equitable and nondiscriminatory roaming agreements."[90] More generally, incumbents' arguments that smaller and mid-sized carriers do not need more competitive roaming options are contradicted by the comments the smaller carriers have filed in the *CMRS Roaming* proceeding, which stated that a "lack of roaming partner choices is a major structural problem within the CMRS industry, and correspondingly, a major problem for smaller and regional wireless carriers and their customers."[91]

It is unsurprising that the parties with the least incentive to promote competition see robustly competitive markets, where the victims of a consolidating industry do not.

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[88] *See, e.g.*, Cellular South Comments at 16.

[89] Cellular South Comments at 19-20.

[90] Verizon Comments at 49.

[91] Comments of Leap Wireless International, Inc., *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, WT Docket No. 05-265, at 2 (Nov. 28, 2005).

D. The Commission Should Adopt Frontline's Proposals Because They Serve Compelling Public Policy Goals, Not Because They Comport With Frontline's Business Plans.

Some commenters criticized Frontline's pro-competitive proposals by asserting that they are simply part of Frontline's business plan. The proposal to use this relatively modest slice of spectrum to achieve certain public policy goals should be analyzed, like any other spectrum allocation proposal, on its merits, looking at both the benefits of adopting measures that will promote competition and the costs of reinforcing the status quo. Frontline, and we expect many others, will then decide if they can use this spectrum to achieve their business objectives. Frontline's (or any company's) business plan has no bearing on this analysis. Instead, the "merely a business plan" argument is simply a tactic to taint Frontline's proposals without actually addressing their merits or offering viable alternatives that will both help public safety and promote competition and innovation. If this were just a case of special pleading, five Commissioners and many commenters would not be expressing the conviction that the proposals have merit in serving the public interest and deserve careful consideration.

Nor are Frontline's proposals "poison pills." Any firm can bid on the E Block license with these conditions, just as any firm can buy a broadcast license with its public interest obligations. What Verizon calls poison is elixir for the public; these conditions do not in fact bar Verizon from buying the E Block. A spectrum cap would be such a bar; conditions on licenses are not.

Instead these conditions are structural measures intended to promote competition by reducing capital costs not for the E Block licensee but for its customers, the logical best hope for local and regional competition against the cellular duopoly. These conditions recognize that spectrum is scarce and no new auctions are contemplated after more than a decade of steady sale of the public's airwaves. These conditions thus assure long-run access to a wide range of service

providers and future innovators. These measures would create wide-ranging benefits for the public as a whole without preventing incumbent carriers from operating their networks in a manner consistent with these proposals

III. PARTICULARLY BECAUSE OF THE POLICY GOALS SERVED BY THE PROPOSED E BLOCK ALLOCATION, THE COMMISSION SHOULD APPLY ITS REGULAR SMALL BUSINESS BIDDING CREDIT POLICIES TO THE E BLOCK AUCTION.

The *Further Notice* tentatively concluded that the Commission should not apply its normal, statutorily-mandated, small business bidding credit principles to the E Block auction. But there is nothing in the comments that contradicts the following plain truths: Frontline is a small business, and Frontline, like other new entrants interested in the E Block or other licenses, needs the small business bidding credit to attract capital to bid on the spectrum. Verizon and the other incumbents who will bid for the E Block are huge businesses that can far more easily raise capital than can Frontline or any small business. The purpose of the bidding credit was and is to permit small firms to start off in competition against highly capitalized firms with the goal over the years of becoming successful firms competing with dominant incumbents. This purpose would be served by opening the E Block auction to any qualified small business armed with a bidding credit. And lastly nothing about the language or policy of the small business bidding credit rule requires the Commission to preclude a small business with a bidding credit from offering its service principally at wholesale, provided that it not sell all its service to one or two dominant incumbents and thus negate the purpose of the bidding credit.

This section of Frontline's reply comments shows why denying the bidding credit to qualifying small business in the E Block auction and only the E Block auction would be inconsistent with the Commission's rules, would violate the Communications Act and undercut its policy goals.

A. Frontline's Proposal Serves Various Congressional and Commission Policy Objectives.

The Communications Act contains various provisions that speak directly to the Commission's responsibilities with respect to the important allocation decisions at stake in this proceeding.

- Section 1 of the Act establishes "promoting safety of life and property" as a principal purpose for the Federal Communications Commission.[92]
- Section 303(g) directs the Commission "generally [to] encourage the larger and more effective use of radio in the public interest."[93]
- Section 309 (j)(10) specifically refers to the need for the Commission in its spectrum allocation and auction functions "to ensure that adequate frequencies are made available to public safety licensees."[94]
- Section 309(j)(7) makes clear that "[i]n making a decision … to assign a band of frequencies to a use … the Commission may not base a finding of public interest, convenience and necessity on the basis of Federal [auction] revenues. …"[95]
- Section 309(j)(3) specifies that an important objective of the Commission's competitive bidding processes is to "promot[e] economic opportunity and competition and ensur[e] that new and innovative technologies are readily accessible to the American people. …"[96]
- This objective is to be accomplished, the same provision goes on to state, "by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of licensees, including small businesses. …"[97]

Congress has thus specified core principles to guide the Commission's actions in this proceeding – public safety, rural service, innovation, new technologies and devices, avoidance of excessive concentration, and small business participation. It is not surprising,

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[92] 47 U.S.C. § 151.

[93] *Id.* § 303(g).

[94] *Id.* § 309(j)(10)(B)(iv).

[95] *Id.* § 309(j)(7)(A).

[96] *Id.* § 309(j)(3)(B).

[97] *Id.*

therefore, that Congressional reaction to the Frontline proposal has been in line with the priorities that the Act establishes. Thus, Representatives Pickering and Harman commented that the Frontline Plan "presents the federal government with one of the last opportunities to create a single, national system to help public safety agencies achieve seamless operability and interoperability."[98] House Commerce Committee Chairman Dingell said that Frontline's Proposal "appear[s] to provide a technologically efficient way to achieve worthwhile policy objectives while preserving an open auction format."[99] And House Telecommunications Subcommittee Chairman Markey emphasized that the Commission should consider proposals such as Frontline's "rather than rushing headlong into a 'fire sale' of these licenses."[100]

The Commission has carefully heeded the policy objectives that Congress embedded in the Communications Act. Indeed, in its *Ninth NPRM* it advanced the idea of a partnership between public safety and a commercial operator in order to accomplish many of the Congressional goals set forth above. Frontline's proposal is an effort to provide a blueprint for implementing that vision.

B. The Commission's Allocations Function Provides Ample Support for Adopting Frontline's Proposals.

The various proposed uses of the E Block spectrum allocation urged by Frontline and endorsed by many other commenters further the allocation goals set forth above. [101] Some have suggested that because Frontline hopes to win an E Block license, its proposal is something

[98] *See* Letter from Reps. Jane Harman and Chip Pickering to the Hon. Kevin Martin, Chairman, FCC, May 17, 2007, *at* http://www.house.gov/apps/list/press/ca36_harman/May_17.shtml.

[99] *See Digital Future of the United States: Spectrum Opportunities and the Future of Wireless*, House Subcommittee on Telecommunications and the Internet, 110th Cong. (Apr. 19, 2007) (statement of Chairman Rep. John D. Dingell).

[100] *See* "Frontline Wireless Adds Partners," *WirelessWeek*, Apr. 12, 2007 (quoting Rep. Markey statement).

[101] Frontline recognizes that its proposals rest on the advanced thinking of the Commission, Cyren Call, and the public safety community. These comments use "Frontline proposal" and "Frontline Plan" as shorthand for the ideas from various sources that it has assembled and built on top of.

other than an allocation plan. Were the Commission to discount allocation proposals because the proponents of those proposals were would-be licensees, it would not have allocated spectrum for cellular services, PCS, satellite, and many other new services. Regardless of whether it is Frontline or another entity that becomes the E Block licensee, the Frontline proposal stands on its own – seeking to satisfy the longstanding allocation goal of providing an interoperable, 4-G national network, accompanied by flexible access to more spectrum in times of emergency and backed by funding that does not depend on the public. The proposal to allocate a commercial E Block spectrum for a new open access, wholesale, roaming network also furthers longstanding allocation goals to promote competition innovation. The proposed network will serve as a platform for new services and new devices pioneered by others, facilitate the emergence of a wireless "third pipe" and loosen the grip of the broadband duopoly and fast-emerging wireless duopoly.

Frontline's proposal may well increase the pool of bidders because it opens the door to new entrants and innovative spectrum users who otherwise would be deterred from bidding against incumbents intent on keeping spectrum out of the hands of potential competitors. A number of entrepreneurs, who are willing, as part of their license obligations, to work with the public safety community, will be attracted by the opportunities to provide wireless network services to businesses currently starved for wireless access because of the present structure of the wireless industry. An auction of 10 MHz for these purposes will also appeal to strategic participants who may have not participated in spectrum auctions in the past, who have no interest in competing with Verizon or AT&T as wireless retailers, but whose business plans and aspirations can be achieved only with wireless platforms that are truly open and wholesale. Finally, large existing businesses, particularly in the high-tech field, may well view the open

access, wholesale network as sufficiently important to their core businesses (both now and in the future) to motivate bidding on the E Block license. [102]

C. Frontline's Qualifications Make it a Suitable Candidate for the Public Safety/Broadband Role it Seeks to Both Create and Implement.

An allocation proceeding is not the place to determine Frontline's qualifications to be the E Block licensee. The E Block has not been created, the conditions of the license have not been established, the auction process has not been launched, and Frontline is not yet a bidder, let alone the high bidder. To the extent that Frontline's make-up is at all relevant to assessing the legitimacy of its allocation proposal, that make-up reflects the entrepreneurial spirit the Commission would promote by structuring the E Block auction as proposed.

- Frontline's CEO, Haynes Griffin, was an early pioneer in the cellular industry. His company, Vanguard Cellular Systems, Inc., headquartered in Greensboro, N.C., was one of the largest independent cellular operators in the United States. At the time that Vanguard sold its operations to AT&T for $1.7 billion, the company had approximately 6.8 million pops with operations focused primarily along the eastern seaboard. Vanguard sold out its cellular interests because Mr. Griffin foresaw that local and regional carriers would have to offer their subscribers a national footprint, and anticipating the growing industry consolidation, he was concerned that the national carriers would design roaming arrangements so as to disadvantage smaller carriers – a concern that has subsequently materialized. He is a past chairman of the board of CTIA.

- As former Assistant Secretary of Commerce for Communications and Information and U.S. Ambassador to the 2003 World Radiocommunication Conference, Janice Obuchowski had an important role in tackling public safety's needs, the promise of wireless, Congress' bidding credit requirements for small businesses and the role of competition and innovation in the wireless industry. [103] As former FCC

[102] The first radio and television stations were launched by equipment suppliers who decided to generate aural and video content so that consumers would have reason to buy the radio and television sets they manufactured. Similarly, it appears that Qualcomm, particularly in foreign countries, may have participated in the wireless services provision industry in order to make known and popularize the features of its CDMA transmission technologies.

[103] As NTIA Administrator, Ms. Obuchowski oversaw, in 1991, the agency's release of the "U.S. Spectrum Management Policy: Agenda for the Future," which provided a comprehensive roadmap for forward-looking reforms, including recommended regulatory, market-based, process and technical changes to "create an improved spectrum management system for the United States." Numerous recommendations in this report ultimately were implemented, including the introduction of competitive spectrum auctions. As WRC Ambassador, she successfully concluded negotiations on 48 agenda items, securing international spectrum allocations for numerous technologies, including WiFi.

chair, Reed Hundt presided over the initial allocation of the public safety spectrum in issue here and was the first chair to conduct spectrum auctions.

- Dr. Stagg Newman, Frontline's Chief Technology Officer, was the Commission's Chief Technologist in 1998 and 1999, and prior to that was the Vice President of Network Access Technologies, Bellcore, where he was responsible for wireless research. At the FCC he advocated for the formulation of rules for the commercial 700 MHz spectrum that were "Internet friendly." As those in the public safety community will attest, he has a deep and sympathetic understanding of the dilemmas and challenges faced by the public safety community.

- John Leibovitz**,** who is a co-founder of Frontline and its Executive Vice President, for Business Development, has in-depth experience with the media and telecommunications industries, including as a consultant with McKinsey & Company, where he focused on strategy and operations for leading mobile operators, TV networks and cable operators. He advised senior management on key issues related to wireless, including auctions, next-generation network technology, and operations support systems. He co-founded two high-tech startups prior to Frontline.

Frontline's first investors – those who stepped up with funding before the Commission had taken the prerequisite regulatory steps – are similarly reflective of the kinds of backers who can be expected to support bidding entities for the shared, broadband, open access, wholesale high-tech network that a properly configured E Block allocation would provide.

- Ram Shriram, worked with Mr. Barksdale at Netscape, and has since invested in start-ups like Google, where he was one of the earliest financial backers and on whose board he currently sits. Closely familiar with start-ups and acutely aware of how innovation in the wireless field is being depressed by industry concentration and lack of open access, he sees the Frontline proposals as serving many commercial, as well as public safety, needs, particularly for the next generation of eBays, amazon.coms, and Googles.

- Jim Barksdale was an entrepreneur of the first rank with McCaw Cellular Communications, an operator of a handful of cable systems in the Northwest, that

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Mr. Hundt has been dedicated to the public safety principles articulated in the Frontline Plan for over a decade. In June 1995 he established the Public Safety Wireless Advisory Committee, a group formed to allow public safety "to define and document its critical need for communications resources and the spectrum which will support them - now and through the year 2010." He also oversaw the allocation of the public safety spectrum at issue here and was the first FCC Chairman to address an APCO Convention.

Both have long shown a strong interest in public safety issues, have viewed with disappointment the government's failure to provide for its pressing needs and see this auction as the country's last, best chance to meet these needs.

made a major commitment to cellular at a time when those licenses attracted only a small number of interested applicants even in the very largest markets. Under his leadership, McCaw became one of the dominant cellular industry players. In addition to serving as COO of AT&T Wireless Services (formerly McCaw), he was also founder and CEO of Netscape – a start-up that ushered in the age of the Open Internet as we know it. Then he headed the Governor's Commission on the Recovery, Rebuilding and Renewal of Mississippi in the aftermath of Katrina and observed first hand the dire consequences of public safety's lacking a state-of-the-art interoperable communications network.

- Software radio technology pioneer Vanu Bose is the President and CEO of Vanu, Inc., which developed the first wireless device to be FCC approved as a software-defined radio. Dr. Bose shares Frontline's intent to promote wireless solutions that maximize flexibility for public safety interoperability and robust commercial platforms. As a graduate student, Dr. Bose worked on the MIT SpectrumWare project at the MIT lab for Computer Science, performing the software radio research that would later evolve into Vanu, Inc. Frontline and Vanu share a focus on critical wireless issues, including reaching underserved rural areas with innovative wireless technology.

- Visionary Silicon Valley investor John Doerr has been a partner since 1980 at Kleiner Perkins Caufield & Byers, where he played a catalytic role in the early growth of the Internet by directing venture capital funding to companies such as Netscape, which Mr. Barksdale headed. He also has directed venture capital funding to Amazon, Compaq, Google, Intuit, Macromedia, Sun Microsystems and Symantec. As a partner, Kleiner Partners shares Frontline's resolve to foster investment and competition in broadband in the U.S. with a wholesale, open access network.

- Frontline partner Mark S. Fowler was appointed to the FCC by President Reagan and served as Chairman from 1981 to 1987. Upon his departure from the agency, the *Wall Street Journal* wrote in an editorial that under his leadership " the FCC did more than perhaps any other federal agency or department to put Reagan principles into practice, peeling away layers of regulations that hamstrung the communications industry." Mr. Fowler has demonstrated a strong commitment to open network access through his implementation of the Computer Inquiry II regime and of Part 68 for both simple and complex terminal equipment.

This team brings operational experience, network build-out experience, relationships with key manufacturers and innovators, as well as solid financial backing, to fulfill the mandate of the E Block should Frontline prevail at the auction. This kind of new entrant, and others similarly situated, is exactly what Congress had in mind when it wrote into Section 309(j)

the mandate that the Commission conduct its auctions in a manner that encourages innovation, competition, and new entrants, particularly small businesses.

D. Allowing Bidding Credits for Eligible and Qualified Applicants is Essential to Ensure Small Business Participation in the E Block Auction.

As Frontline showed in its initial comments, the Commission's tentative conclusion that a small business would be incapable of accessing the capital necessary to develop and operate a national network and therefore should not be eligible for a bidding credit under the Commission's normal designated entity policy is factually incorrect and would result in poor policy.[104] Any small business willing to take on the E Block licensee's obligations will have, just as Frontline has, worked with equipment manufacturers, operational engineers, representatives of high tech industries, and tower site rights holders to assure themselves that their buildout and operational plans are feasible.[105]

> Fortunately, as Vanu, Inc., pointed out in its initial comments,
>
> changes in the wireless industry have [ ] reduced the capital outlay required for building new networks. In particular, the sharing of towers has greatly reduced one of the largest capital outlays required to build a new network and the emergence of hosted core network solutions eliminates the capital outlay required for switching equipment.[106]

This means that a new entrant charged with building a shared public safety network will not be starting wholly from scratch. Moreover, a new entrant could engage such global companies as Alcatel-Lucent, Nortel or Ericsson to construct this interoperable, nationwide broadband

[104] Statements in the *Further Notice* show that the Commissioners understand their statutory obligation under § 309(j). *See, e.g.*, *Further Notice,* Statement of Commissioner Deborah Taylor Tate at 168 ("we must be particularly mindful of the [] Congressional directive [of] encouraging small businesses, rural telephone companies, and businesses owned by members of minority groups and women to participate in the auction").

[105] Indeed, to analogize the cost of such a network to the cost of establishing a new nationwide satellite network, as the Commission did in its first tentative conclusion by invoking the DBS and DARS auctions, *see Further Notice* at ¶ 285, is to engage in the proverbial apples vs. oranges comparisons.

[106] *See* Vanu, Inc. Comments at 6.

network. An opportunity of this type will also attract well-qualified applicants (including new entrants and small businesses) with specialized knowledge of the relevant technologies, devices and services. Granting designated entity eligibility will allow new entrants to compete at auction against the incumbents because they will have the ability to raise the necessary funds.

The Commission's tentative conclusion to exclude small businesses from the upcoming auction would arbitrarily relegate eligible designated entities to "less important" communications services.[107] Such a result would be inconsistent with the statutory mandate of Section 309(j) and would further cement the stranglehold already enjoyed by the powerful incumbent providers. In contrast, by allowing eligible small businesses to compete as designated entities, the Commission would fulfill its stated desire, and the oft-articulated goal of individual Commissioners, to foster competition with the incumbents.[108]

Verizon claims that the obligations Frontline has urged be placed on the E Block licensee – buildout of the public safety network and operation of an open access, wholesale commercial service – would virtually ensure that entities (presumably such as itself) with "the experience necessary to construct a wireless network as vital to the needs of Public Safety and the nation's security as this one" would not participate in the auction. The result, Verizon argues, would be to assign the network buildout and subject public safety's needs to "an

[107] *See* Frontline Comments at 58-62. As Frontline has noted, the Commission is free to impose financial qualification requirements on all prospective bidders, alike, to ensure the winning entity has the resources to construct and operate a nationwide network. *See* Frontline Comments at 60, n. 90.

[108] For these reasons, bidding credits are needed in order to neutralize the incumbents' myriad advantages at auction. See Frontline Comments at 66 ("Without [bidding credits], small businesses, with no revenue or cash on hand, will be simply unable to attract the funds necessary to compete with incumbents who, in the case of Verizon, have $24 billion in interest-free cash reserves with which to bid. Bidding credits are also necessary for new entrants to counter the 'blocking premium' [ ] that entrenched incumbents will be willing to pay in order to keep out new competitors.").

unknown and untested entity."[109] Apparently, Verizon believes that only wireless incumbents are qualified to carry out the goals of the E Block auction.

In fact, both Frontline's and NPSTC's comments point out that the network sharing agreement between the E Block licensee and the National Public Safety Licensee will "ensure that the network is built to public safety standards, including requirements on reliability, redundancy and restorability," and will "reflect public safety's meaningful participation in the technology, deployment, rollout, administrative, and logistic decisions associated with the network."[110] And their investors will assure that E Block bidders will have developed "the experience necessary" to partner with public safety on this critically important project. Verizon's suggestion that a new entrant winner of the E Block auction would be insufficiently sophisticated to provide a public safety network as reliable as one constructed by an incumbent is both self-serving and ignores its own laggardly history. The Commission's rules, public safety's proposed pre-auction Statement of Requirements that both APCO and NPSTC proposed[111] and that Frontline endorses, and the network sharing agreement will assure that public safety will get the network it needs and deserves.

The Commission's second tentative conclusion that the impermissible material relationships rule would prevent a designated entity from offering its network on an open access, nondiscriminatory wholesale basis (and therefore make it ineligible for a small business bidding credit) is rebutted by the rationale behind the rule. The *Ad Hoc* Spectrum Coalition correctly notes that the intent of the rule was to prevent exclusive leasing or resale arrangements between sham Designated Entity applicants and large incumbents that allowed the latter, as a lessee or

[109] Verizon Comments at 56. Verizon's inadequate coverage proposal is evidence itself that a new entrant is more likely to serve public safety's needs than an incumbent.

[110] NPSTC Comments at 12.

[111] *See id.* at 10; APCO Comments at 15.

buyer, to exercise absolute control over discounted spectrum.[112] On the other hand, the parties that claim the impermissible material relationships rule should exclude otherwise qualified small businesses from receiving bidding credits make no effort to show how the E Block's wholesaling of its open access network services is the type of relationship that is "inconsistent with Congress's legislative intent."[113]

The rule itself does not bar wholesaling *per se*. It bars only wholesaling that is a form of leasing and reselling. However, Frontline's proposal does not call for leasing or reselling. In addition, the rule relates to lease or resale of *spectrum* capacity (i.e., raw spectrum), whereas Frontline's proposal calls for wholesaling fully built-out *network* service capacity. The Report and Order adopting the rule made clear that this is a decisive distinction because the rule sought to ensure that "benefits are awarded to provide opportunities for designated entities to become robust independent *facilities-based* service providers with the ability to provide new and innovative services to the public."[114]

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[112] *See* Public Interest Spectrum Coalition Comments at 38; *see also* Comments of Council Tree, *Service Rules for the 698-746, 747-762, and 777-792 Bands et al.*, WT Docket Nos. 06-150, 06-169, 96-86, PS Docket No. 06-229 at 11, (May 23, 2007) ("Council Tree Comments") ("[D]esignated entities providing wholesale services would not be 'leasing raw spectrum.' They, too, would be building networks and providing service using that valuable infrastructure"). *See also* Matthew Lasar, *FCC Puts Curbs on License Flipping*, Lasar Letter (Apr. 26, 2006), *available at* http://www.lasarletter.net/drupal/node/84 (discussing adoption of impermissible material relationships rule).

[113] MetroPCS Comments at 61 (quoting *Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules Procedures*, Second Report and Order and Second FNPRM, WT Docket No. 05-211 (Apr. 25, 2006)). MetroPCS claims that Frontline has changed its position on the impermissible material relationship issue, first admitting the rule would apply to it and asking for a waiver, then claiming the rule did not apply. *See* MetroPCS Comments at 61-62. But Frontline's position has been consistent throughout this proceeding – the rule contemplates a type of wholesaling arrangement that is completely different in form and effect from that proposed for the E Block, and it should therefore not apply. *Compare* Frontline Service Rules Proposal at 8 n. 7 ("[Commission] should make clear that [impermissible material relationships rule] will not apply to the E Block auction") *with* Frontline Comments at 65 "[Commission should] interpret its bidding credit rules, and the reference to wholesale services in particular, as not applying to the E Block auction.").

[114] *In the matter of Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures*, Second Report and Order and Second Notice of Proposed Rulemaking, 21 F.C.C. Rec. 4753, 4762 ¶ 21 (2006) (emphasis added).

Accordingly, the Commission should both adopt a wholesale requirement and hold that otherwise qualified small businesses are eligible for bidding credits in the E Block auction. If the Commission believes that that is the best use of the spectrum, it should not turn around and use that determination as a basis for withholding the benefits of its normal small business bidding credit program.

For the reasons described above, the Commission should allocate the E Block for a shared public safety/private broadband network that serves public safety's critical needs and offers open access wholesale services. Consistent with both goals of the requested allocation, the Commission should apply its customary, Congressionally-mandated small-business bidding credit policies.

Respectfully submitted,

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EXHIBIT 1

I, Craig J. Mathias, hereby declare the following:

I. SUMMARY

1. The purpose of this declaration is to explore certain elements of open-access networks, specifically, wide-area wireless networks (WWANs) based on the Internet Protocol (IP). With IP now the dominant means for implementing both local- and wide-area networks, wired and wireless, it is fair to ask if a given WWAN implementation based on IP could be used to provision multiple simultaneous mission-critical services, both commercial and public-safety, and whether the specific needs of the public-safety/first-responder community can be met by such a network architecture. I believe that open-access networks build upon the obvious success of the Internet, wherein common protocols form the basis for a network manifestly capable of supporting multiple classes of service simultaneously. Applying this model to a single network operated by a single entity, it is not difficult to see how open-access networks will clearly form the basis of all major network implementations going forward. The key, beyond a common network protocol stack, is the ability to prioritize particular packet streams above others – a feature universally available in the IP protocols stack, and widely implemented on public and private networks today.

2. It is still, however, fair to ask if such a network can support vital public-safety services efficiently and effectively. With respect to lawful intercept and CALEA, it is an essentially simple matter to *route particular targeted packet streams to intercept points* where information may be recorded or interpreted. With respect to E911 services and related capabilities, routing can again be easily employed, *with position/location information processed on a priority basis* and applied to any selected and desired traffic.

Strong authentication and encryption mechanisms are in use today on IP networks, via well-established standards, and the integrity inherent in IP-based networks (the Internet itself was designed for survivability in the event of massive physical damage to network infrastructure) represents the best available approach to maintaining *mission-critical services*, whether public or commercial. In short, an open-access, *IP-based network is the best choice for mission-critical, multi-client, multi-service implementations*.

3. A wholesale/retail business model could be used to implement a shared-access network designed to serve multiple simultaneous constituencies, with the wholesaler implementing all of the basic services noted in this document, and the retailer deciding on the specific mix of services to be provisioned to their intended customer and user base. Note also that the concepts discussed in this document are *independent* of any particular wireless frequency band, and that the requirement for new equipment, universal at 700 MHz., creates an excellent opportunity to pursue an open-access strategy. Note finally that an all-IP, open-access approach is *independent of any specific radio technology*, and that IP services are currently available on a wide variety of wireless networks on a global basis today.

4. I believe that open-access wireless networks will form the basis of multi-service deployments going forward, and there are no significant technical concerns that would preclude such deployments.

II. QUALIFICATIONS

5. At present, I provide technology, strategy, and marketing advice and analysis to telecommunications clients around the world through my own consulting firm, Farpoint Group. Founded in 1991, Farpoint Group specializes in wireless

communications and provides advisory services on a project basis to equipment manufacturers, network operators, enterprise end-users, and the financial community. Farpoint Group has no exclusive arrangements with any suppliers or clients, and has no investments in any wireless firm of any form. I write columns for *Computerworld.com* and *SearchMobileComputing.com,* and a blog on wireless topics for *Unstrung.com*. I also author both technical and overview articles for such publications as *Business Communications Review* and *Network World,* and currently serve on the Conference Advisory Boards of the *INTEROP, INTEROP New York,* the *Mobile Business Expo (MBX),* and *WiMAX World* conferences. Prior to forming Farpoint Group, I was Director of Marketing and Director of Corporate Development for Stellar Computer (later Stardent Computer), a manufacturer of graphics supercomputers, and was an early member of the management team at GRiD Systems Corporation, inventor of the laptop computer, where I was responsible for the engineering of all communications, networking, and server products and services. I am a member of the Institute of Electrical and Electronics Engineers (IEEE), the Society of Sigma Xi, and a frequent speaker at wireless industry events. I hold an Sc.B. degree in Applied Mathematics/Computer Science from Brown University. A complete CV is attached.

III. THE KEY CHARACTERISTICS OF MULTI-SERVICE NETWORK ARCHITECTURES

6. With the continued development and proliferation of the Internet Protocol (IP) family of standards, and the Internet itself, which is based on these protocols, there has been an increasing emphasis over the past two decades on *multi-service* network architectures. Such networks are designed to accommodate a broad mix of traffic types and applications, and have been driven by the global success of the Internet, the

availability of both infrastructure and client products supporting this capability, and basic economic demands satisfied by networks that are fundamentally shared among multiple constituencies. The key concepts behind this philosophical approach to network architectures are as follows, and apply to any IP-based network, wired or wireless:

- *Open Access* – The IP protocol itself is designed to allow a broad variety of devices to connect to a network based on it, provided, of course, that these devices correctly provision all implementation-specific necessary components of the IP protocol stack itself, and that proper authorization and authentication of the device and/or its current user are established. The use of IP enables a potentially broad choice of possible subscriber units to fit essentially any application requirement. The key basic requirement in any IP network is the provisioning of sufficient bandwidth to handle the intended peak volume of connections and to allow enough headroom in network bandwidth so as to handle any instantaneous traffic demands, typical of the time-bounded traffic involved in voice traffic or streaming video on an IP network. In wireless networks, available bandwidth is directly related to the amount of spectrum allocated.
- *Interoperability* – Products conforming to the widely-used IP protocols, whether infrastructure or client in nature, are designed to work together seamlessly and with a minimum of configuration. This means that IP networks can grow and adapt easily as new requirements for coverage, capacity, or mission appear. IP is suitable to essentially any network-based application, and the fundamental interoperability of IP-based subscriber

units means that end-users have, and will continue to benefit from, a broad variety of products at reasonable prices that are suitable to a very broad array of missions and applications. Interoperability is, of course, critical in the vast majority of applications, and most importantly in the case of public safety and emergency/first response.

- *Prioritized Access* – A key concept in modern IP networks is that of *Class of Service (CoS)*, which allows individual IP connections to have an associated priority that determines how traffic is handled either for reasons of policy or during emergency or other unusual circumstances. Given traffic demand that does not exceed the capacity of the network (i.e., all traffic at any given moment in time can move through the network without the need for intermediary queuing that introduces delay), prioritization is of little value, but such becomes critical under circumstances of traffic congestion. Prioritization can be established simply by expediting priority packets, while delaying traffic of lesser importance. Priority can be determined in any given situation via the authentication of a given device (and specific user, if desired) or other policy, with no other changes to network configuration required. The key advantages of such a strategy are the optimal use of available spectrum, in that no spectrum need be reserved for high-priority or emergency operations that otherwise might remain unused at any given moment in time, and that spectrum can thus be made *instantaneously* available for high-priority traffic when required.

7. The availability of wireless all-IP networks designed for mobility, broadband, and with full support for prioritized and time-bounded traffic, actually defines the next generation of wireless network, often described as *NGN* or *4G*. The 4G concept is independent of any specific radio technology, and is already applied in both WiMAX and Wi-Fi implementations today. I believe that *all* wireless networks will eventually support this model, as such provides the ability for operators to optimally allocate bandwidth without the need for the subdivision of spectrum by class of service or type of traffic being served. Because each packet in an IP stream can be individually prioritized, it is quite simple to provide multiple classes of service and to dynamically alter priorities when policies or specific needs so dictate. For example, a single 4G network could handle voice, data, video, sensor-based communications, and more, and easily mix public-safety and commercial traffic as desired. Regardless, IP provides a reliable mechanism for the transport of arbitrary digital data, and its capabilities have been well-proven over the years in both public and private networks of all sizes.

8. As the expense involved in the buildout of contemporary wireless networks can be considerable, if not enormous, it makes sense to share network functionality across a wide variety of applications, both commercial and government. As shared-access networks, as I have noted above, are designed to accommodate a wide variety of mobile and fixed subscriber units, along with a varying mix of traffic inherent in provisioning service for multiple applications, it becomes feasible, *if not desirable*, to in fact operate, in any given area, one large high-performance network and intelligently share access and bandwidth based on user and/or application priority. The technology required to implement such a network, primarily in the form of network management

systems, operational support systems, and network policy engines, exists today, and thus represents essentially no technical risk. For all of the above reasons, *I believe that shared, open-access broadband wireless networks will become the dominant, if not only, network implementation solution over the next few years.*

IV. OPEN ACCESS AND CALEA

9. Lawful intercept of communications traffic is an essential facility in any public-access communications network, and has been implemented in the PSTN and cellular networks for many years. The emergence of IP-based digital communications represents a significant challenge to lawful intercept, in that traffic can be routed through multiple paths in a given network. A single open-access network, however, can be configured to support lawful intercept and other CALEA facilities with relatively little effort.

10. Every device successful in attaching to an open-access network will of necessity need to provide authentication information, identifying the device itself and often a specific user as well. An operator of an open-access network would thus know the specific IP address assigned to this device, and thus could monitor any traffic to or from this device. Captured data could be recorded and/or otherwise made available in raw digital form, as an IP packet stream, or, if voice traffic, converted into any desired form meeting established analog or digital telephony standards. It is thus no more complex to support CALEA functions in an open-access implementation than in any other communications network, and perhaps far simpler. Moreover, assuming a single entity were in operational control of a given open-access network, all packets in a given stream

could be easily captured. This would not, however, necessarily be the case in an uncoordinated network, such as the Internet.

V. OPEN ACCESS AND E911

11. Fulfillment of the E911 mandate of necessity involves the implementation of a position/location sensing mechanism within a given wireless network. A number of techniques have been developed to implement this capability, including the use of Global Positioning System (GPS) receivers in mobile devices and infrastructure-only solutions based on Time Difference of Arrival (TDOA) and Angle of Arrival (AOA). GPS-based solutions are frequently implemented via Assisted GPS (A-GPS), which involves the use of terrestrial servers to augment the capabilities implemented in the mobile device. Such is particularly useful in urban environments where a clear view of the sky and thus GPS satellites is sometimes, if not often, at least temporarily impaired. Regardless, any of these positioning techniques can work quite effectively in mobile applications.

12. Regardless of the specific position/location technology selected, there are no fundamental technical issues in the implementation of E911 services on any of them, and also no fundamental technical challenges in using shared-access IP transport for E911 services as well. As was noted above, IP transport is independent of specific traffic type, with the prioritization of individual packets the key variable in the implementation of any given service. Thus IP packets containing E911 data can be processed like any others, and given appropriate priority as may be required. The routing of E911 information to PSAPs is also no more complex than any other element of IP-based communications, with the added benefit of end-to-end security and integrity (see Section VI., below).

VI. OPEN ACCESS AND NETWORK SECURITY AND INTEGRITY

13. Security is (or, at least, always *should be*) a primary concern in any given network implementation. With the growth of the Internet, many IP-based security mechanisms have been developed and widely deployed. Effective security implementations have the following three key elements:

- *Authentication* – This element involves proving the identity of a given device and/or user to the network to which it desires to connect, and, in the case of *mutual authentication*, the network similarly proving its identity to the device and/or the user. Authentication is critical in both commercial and public-safety applications alike, and the mechanisms applied to both cases can be identical or not. A popular and effective technique is the use of authentication based on the IEEE 802.1X standard, which itself is based on the Extensible Authentication Protocol (EAP). The flexibility inherent in the 802.1X approach allows the use of a wide variety of authentication techniques - for example, digital certificates, hardware tokens, or simple username/password combinations.
- *Authorization* – Authorization determines the specific privileges and capabilities that a given device and/or user will have on the network once authenticated. These privileges can include, among other elements, network traffic priority, the ability to connect to certain services, and the ability to access certain applications. For example, a given user, in combination, if desired, with a specific device or class of device, might be allowed only access to the Internet and World Wide Web, or might be

allowed to connect to infrastructure and services provisioned to implement public-safety services. Such capabilities are common in essentially all IP-based networks today. Location information, obtained through the same location and tracking mechanism as is used to implement E911, could also be a factor in authorization policies and decisions, implementing what are known as *location-based services*. Thus specific privileges and capabilities could be restricted or enabled based on the location of a given user and/or mobile device. Specific instances of authorization are established via policy engines usually implemented as part of network management systems.

- *Encryption* – Encryption is the encoding or "scrambling" of content (and, increasingly, packet header and control information as well) to prevent its interception or modification by unauthorized parties. Encryption is commonly applied to digital cellular and Wi-Fi communications today, and can function at Layer 2 of the IP protocol stack and above. At Layer 2, encryption specific to a given wireless *technology* can be applied. This, however, only protects information over the *airlink* portion of the network value chain. *Virtual Private Networks (VPNs)* are thus applied to implement end-to-end encryption across the entirety of a given network connection. These are most commonly implemented via *IPSec* at Layer 3 and *SSL* at Layer 4, and both of these technologies are readily available and widely implemented today. VPNs may be applied to entire networks, or on a session-by-session basis, again with parameters specific to the

needs of a given connection at any moment in time. In conjunction with the encryption of sensitive data stored both on servers and on mobile devices, very comprehensive and effective security - *tailored to the needs of a given application or constituency* - can be easily implemented on modern IP-based networks.

14. Open-access networks allow individual traffic streams to have different security keys or even different security mechanisms applied; this is the essence of the virtual private network. Two simultaneous streams can use different security keys, or entirely different authentication and encryption mechanisms as may be desired. There are thus no key technical issues associated with establishing and maintaining secure communications over a shared-access network. Commercial and public-safety traffic can be secured according to policies appropriate to each.

15. A larger question, however, centers on the more difficult issue of overall network *integrity*. Key guidelines for the successful implementation of any mission-critical network include the elimination of any single points of failure, as well as the ability of the network to self-reconfigure in the event that any network elements fails. The Internet Protocol itself was, of course, designed with survivability in mind. IP can route around failed (or simply congested) units, and traffic-management policies, including traffic prioritization, are easy to implement. Moreover, in wireless networks, the failure of a given base station or access point simply results in a reconfiguration of the remaining network infrastructure and the client automatically re-establishing a connection with another base station or access point. Network routing, switching, and

control facilities can be redundantly implemented. A shared-access wireless infrastructure can thus have very high integrity matching its comprehensive security solutions.

V. ISSUES RELATED TO THE COMMERCIALIZATION OF OPEN-ACCESS WIRELESS NETWORKS

16. It is important to note that any given implementation of an open-access wireless network will of necessity select specific features and capabilities appropriate to the business model of the operator. In a wholesale/retail model, for example, the wholesaler would be responsible for putting in place all of the technical elements required to implement the capabilities discussed in this document, while the retailer branding and reselling the services implemented by the wholesaler would be responsible for the delivery of specific services in a specific form suitable to its business model, mission, customers, users, and applications.

17. It is also important to note that the open-access strategy is *independent of any underlying radio technology*. The layered approach to modern network architectures and implementations in fact allows multiple radio technologies to be applied to this concept. For example, IP-based services are today wide available on Evolution Data-Optimized (EV-DO), Universal Mobile Telecommunications System (UMTS), High-Speed Packet Access (HSPA), WiMAX, and Wi-Fi networks. I believe that IP is the in fact the *only* protocol of importance going forward, and will form the basis of data and unified voice/data/video communications services on the upcoming Long-Term Evolution (LTE) and Ultra-Mobile Broadband (UMB) networks as well. The decision to market any wireless services based on these technologies as open-access is essentially

rooted in business strategy; there are no significant technical issues challenging this approach in any implementation of an IP-based network.

18. Note also that this discussion is in no way unique or intrinsic to the proposed allocation of the 700 MHz. bands. The concept of open access and the other service elements discussed in this document can be applied to essentially *any* wireless spectrum. The buildout of services in the 700 MHz. bands will of necessity involve new equipment (both infrastructure and subscriber units), regardless of the specific winning bidder in any given case, and regardless of the specific technical and business strategies applied by the winning bidder. There is thus no disadvantage in the pursuit of an open-access service in the 700 MHz. band, and the availability of the 700 MHz. spectrum in fact represents an excellent opportunity to pursue what I believe is the most appropriate, if not optimal, approach to provisioning service in this spectrum.

VI. CONCLUSIONS

19. I have shown in the above discussion the fundamental flexibility inherent in open-access wireless networks. All-IP wireless networks with support for prioritized and time-bounded traffic, based on technology readily available and deployed today, can easily meet the needs of both the commercial and public-safety communities. Sharing a common infrastructure represents the best use of available spectrum. Support for lawful intercept, CALEA, and E911 can be provided with very little technical risk. The fundamental security mechanisms inherent in IP, along with its well-established capabilities with respect to overall network integrity, further speak in favor of a shared-access approach to future network deployments. Finally, the upcoming availability of spectrum in the 700 MHz. bands represents a unique opportunity for the implementation

of an IP-based, broadband, mobile, shared-access, multi-service network. Again, I believe that IP-based, shared-access networks are the key to cost-effective network deployments offering the greatest flexibility and highest levels of service, irrespective of application.

Declaration

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed on June 1, 2007

Craig J. Mathias